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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/624,062	07/24/2000	Shoicho Hirota	81940.0001	6479

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EXAMINER

AKKAPEDDI, PRASAD R

ART UNIT PAPER NUMBER

2871

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/624,062

Applicant(s)

HIROTA ET AL.

Examiner

Prasad R Akkapeddi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 3-5,9,10 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-5,9,10 and 15-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \*   c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/21/2004 has been entered.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 3, 4, 9, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al. (Itoh) (U.S. Patent No. 5,841,496) in view of Suzuki et al. (Suzuki) (U.S. Patent No. 6,433,845).

As to claims 3, 4, 9, 15 and 16: Itoh discloses a reflection type liquid crystal display apparatus of a normally black display system (col. 28, lines 20-23) comprising a first (12) and a second substrate (22), a liquid crystal layer (10) sandwiched between the first and second substrates, a transparent electrode (14) arranged on the first substrate (12), a plurality of pixels each having a

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switching element (driving circuit col. 15, lines 30-31) and a reflection electrode (31) arranged on the second substrate and a phase plate (19) and a polarizing plate (13) arranged on a side of the first substrate (12).

Itoh also discloses the projections of Stokes parameter (S1, S2, S3) of light between the phase plate and the liquid crystal layer on an S1-S2 plane constitute a substantially linear line (Fig. 31) and (col. 30, lines 62-67 and col. 31, lines 1-38).

Itoh discloses the relevant parameters (summarized in Table 1), including the retardation of the liquid crystal layer (740nm to 860nm Fig. 33), twist angle of the liquid crystal layer (200 to 270 degrees, col. 36, lines 60-61), azimuth angle (45 to 80 degrees, col. 6, line 32) and the retardation of the phase plate being (between 320nm to 420nm, Fig. 32).

Itoh teaches that the phase plate (19) has a retardation values between 320nm to 420nm, however, Itoh does not disclose that the polarized light at a reflecting plane of the reflection electrode is substantially circularly polarized in any of the wavelengths nor does Itoh disclose the transmission axis of the polarizing plate and a liquid crystal orientation direction is larger than  $-32$  degrees and equal to or smaller than  $-16$  degrees.

Suzuki in disclosing a reflection type liquid crystal discloses the use of a quarter wave plate (25) in addition to a polarizer (15), the combination of which gives a circularly polarized light as described in the previous office actions including the advisory action dated 12/02/2003. In Fig.13, Suzuki discloses the

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transmission axis of the polarizer (311) and the liquid crystal orientation direction (304) being in the range of  $-15$  to  $-75$  degrees (col. 15, lines 27-30). Suzuki also teaches the optimization of the design parameters, similar to Itoh, for the liquid crystal display and these parameters also given in Table 1 for comparison.

Table I

Design Parameter	Claims 3 & 15	Claims 4 and 16	Claim 9	Itoh	Suzuki
Retardation of the LC	200-300nm	250nm	$\sim$ 400nm	740-860nm	200-350nm
Twist angle of the LC	40-55 degrees	50 degrees	55-60 degrees	240-270 degrees	60-90 degrees
Angle of the transmission axis	$-32$ to $-16$ degrees	$-26$ degrees	0 or 90 degrees		$-15$ to $-75$ degrees
Azimuth angle	70-81 degrees	76 degrees	73 $-$ 74 degrees	45-80 degrees	45-65 degrees
Retardation of the phase plate	320-430nm	380nm	160-200nm	320-420nm	138nm

As can be seen from Table 1 that the teachings of both Itoh and Suzuki essentially cover all the design parameters and the goal is to optimize these parameters for enhanced contrast ratio and brightness of images.

Note that the range for the above design parameters given in Table 1 as disclosed by Itoh and Suzuki overlaps the ranges asserted in claims 3,4,9 and 15. Therefore, the range in claims 3,4,9,15 and 16 would have at least been

obvious. See In re Malagari, 499 F.2d 197, 182 USPQ 549 (CCPA 1974).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the circular polarized light and the values for the design parameters given by Suzuki to the device of Itoh for optimization and to enhance the contrast ratio and brightness of the images (col. 4, lines 47-49).

It is respectfully pointed out that the applicant did not disclose that the use of the specified design parameters will result in unexpected results/properties in the performance of the reflective color liquid crystal display.

Evidence of unexpected properties may be in the form of a direct or indirect comparison of the claimed invention with the closest prior art which is commensurate in scope with the claims. See In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and MPEP § 716.02(d) - § 716.02(e). See In re Blondel, 499 F.2d 1311, 1317, 182 USPQ 294, 298 (CCPA 1974) and In re Fouche, 439 F.2d 1237, 1241-42, 169 USPQ 429, 433 (CCPA 1971) for examples of cases where indirect comparative testing was found sufficient to rebut a prima facie case of obviousness.

The patentability of an intermediate may be established by unexpected properties of an end product "when one of ordinary skill in the art would reasonably ascribe to a claimed intermediate the contributing cause' for such an unexpectedly superior activity or property." In re Magerlein, 602 F.2d 366, 373, 202 USPQ 473, 479 (CCPA 1979).

“In order to establish that the claimed intermediate is a contributing cause’ of the unexpectedly superior activity or property of an end product, an applicant must identify the cause of the unexpectedly superior activity or property (compared to the prior art) in the end product and establish a nexus for that cause between the intermediate and the end product.” Id. at 479.

4. Claims 5, 10 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh and Suzuki as applied to claims 3, 9 and 15 above, and further in view of Vagyu (U.S. Patent No. 6,133,894).

Although Suzuki (col.11, lines 30-33) discloses a color filter substrate with color layers of red, green and blue (primary colors), Suzuki does not disclose the use of a light source for irradiating the LCD with three primary colors and time switching on a time division basis.

However, Vagyu discloses a light source for illuminating a liquid crystal display containing three primary colors and a method of switching between the three primary colors to obtain images (col. 6, lines 31-53).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the light source and the switching as disclosed by Vagyu to the liquid crystal display device disclosed by Suzuki to provide high spatial frequency and high resolution image display system (col. 2, lines 25-27).

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***Response to Arguments***

5. Applicant's arguments with respect to claims 3, 9 and 15 have been considered but are moot in view of the new ground(s) of rejection.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 571-272-2285. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Prasad R Akkapeddi, Ph.D  
Examiner  
Art Unit 2871

PRA  
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TARIFUR R. CHOWDHURY  
PRIMARY EXAMINER